

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-11. (canceled).

12. (previously presented) An oxygen concentration detector comprising:
a sensor element including a solid electrolyte and external and internal electrodes provided on external and internal surfaces thereof, respectively;
a heater provided adjacent to said internal surface of said sensor element;
wherein said internal electrode consists of a material having an emissivity of 0.3 or more, and said external electrode consists of a material having an emissivity lower than the emissivity of said internal electrode; and
wherein a clearance is formed between the heater and the internal electrode, the clearance being 0.1 mm or more.

13. (previously presented) An oxygen concentration detector according to claim 12, wherein said internal electrode consists of platinum black or ruthenium oxide.

14. (previously presented) An oxygen concentration detector according to claim 12, wherein a surface of said internal electrode facing said external electrode consists of a material having an emissivity higher than the emissivity of said external electrode.

15. (previously presented) An oxygen concentration detector according to claim 12, wherein said internal electrode material has an emissivity of more than 0.6.

Claims 16-20 (canceled).

21. (previously presented) An oxygen concentration detector comprising:
a sensor element including a solid electrolyte and external and internal electrodes provided on external and internal surfaces thereof, respectively;
a high-emissivity layer provided on a surface of said internal electrode; and a heater disposed adjacent to said high-emissivity layer to form a clearance therebetween, the clearance being 0.1 mm or more, wherein:

said internal electrode has an emissivity less than that of said high-emissivity layer; and

said high-emissivity layer has an emissivity of 0.3 or more, and a porosity more than 10 percent.

22. (previously presented) An oxygen concentration detector according to claim 21, wherein said high-emissivity layer substantially consists of at least one material selected from a group consisting of alumina, titanium oxide, zirconium oxide, iron (III) oxide, nickel oxide, manganese oxide, copper oxide, cobalt oxide, chromium oxide, yttrium oxide, cordierite, silicon nitride, aluminum nitride, and silicon carbide.

23. (previously presented) An oxygen concentration detector according to claim 21, wherein said internal electrode is made of only noble metal.

24. (previously presented) An oxygen concentration detector according to claim 21, wherein said high-emissivity layer has a surface roughness of 1 μm or more.

25. (previously presented) An oxygen concentration detector according to claim 21, wherein said high-emissivity layer has a thickness of 5 μm or more.

26. (previously presented) An oxygen concentration detector according to claim 25, wherein the thickness of said high-emissivity layer is in a range of 10-20 μm .

27. (previously presented) An oxygen concentration detector comprising:
a sensor element including a solid electrolyte and external and internal electrodes provided on external and internal surfaces thereof, respectively;
a heater disposed within said sensor element adjacent to said internal electrode;
and a high-emissivity layer provided on a surface of said heater to form a clearance between said high-emissivity layer and said internal electrode,
wherein said high-emissivity layer has an emissivity of 0.6 or more, and a porosity more than a predetermined value.

28. (previously presented) An oxygen concentration detector according to claim 27, wherein said high-emissivity layer substantially consists of at least one material selected from a group consisting of iron (III) oxide, nickel oxide, manganese oxide, copper oxide, cobalt oxide, chromium oxide, silicon nitride, aluminum nitride, and silicon carbide.

29. (previously presented) An oxygen concentration detector according to claim 27, wherein said internal electrode is made of only noble metal.

30. (previously presented) An oxygen concentration detector according to claim 27, wherein said high-emissivity layer has a surface roughness of 1 μm or more.

31. (previously presented) An oxygen concentration detector comprising:
a sensor element including a solid electrolyte and external and internal electrodes provided on external and internal surfaces thereof, respectively;
a heater disposed at an inner side of said internal electrode to be adjacent to said internal electrode;
a first high-emissivity layer provided on a surface of said heater; and
a second high-emissivity layer provided on a surface of said internal electrode,
wherein,

said internal electrode has an emissivity less than that of said second high-emissivity layer;

each of said first high-emissivity layer and said second high-emissivity layer has an emissivity of 0.3 or more, and a porosity more than a predetermined value; and

said first high-emissivity layer is separated from said second high-emissivity layer to form a clearance therebetween, the clearance being 0.1 mm or more.

32. (currently amended) An oxygen concentration detector comprising:

a sensor element including a solid electrolyte and external and internal electrodes provided on external and internal surfaces thereof, respectively; and

a heater disposed adjacent to said internal electrode to form a clearance therebetween, the clearance being 0.1 mm or more;

wherein said heater has an emissivity of 0.6 or more, wherein said heater has a polygonal cross-section.

Claim 33 (canceled).

34. (previously presented) An oxygen concentration detector according to claim 32, wherein said heater consists of at least one material selected from a group consisting of silicon nitride, aluminum nitride and silicon carbide.

35. (previously presented) (previously presented) An oxygen concentration detector according to claim 32, wherein said internal electrode is made of only noble metal.

36. (previously presented) An oxygen concentration detector comprising:
a sensor element including a solid electrolyte and external and internal electrodes provided on external and internal surfaces thereof, respectively; and
a heater disposed adjacent to said internal electrode;

a high-emissivity layer provided on a surface of said internal electrode to form a clearance between said heater and said high-emissivity layer, the clearance being 0.1 mm or more,

wherein said high-emissivity layer has an emissivity higher than that of said external electrode,

wherein said high-emissivity layer has a porosity of more than 10 percent.

37. (previously presented) An oxygen concentration detector according to claim 35, wherein each of said external and internal electrodes is made of only noble metal.